

Claims

I claim:

5 1. A visual inspection device configured to traverse a steam dam around a perimeter of a nuclear boiling water reactor vessel, the device being adapted to support a camera for performing visual inspections, the device comprising:

10 a trolley including at least two roller assemblies coupled by a connecting member, the roller assemblies being configured to steer the trolley around the perimeter of the reactor vessel, at least one of the roller assemblies being driven by a first motor;

15 a mast coupled to and upstanding from the trolley;

an elevating mechanism coupled to the mast;

20 a carriage coupled to the mast and the elevating mechanism, the carriage being responsive to activation of the elevating mechanism for movement relative to and along the mast;

25 a first arm rotatably coupled at a first end to the carriage; and

30 a second arm rotatably coupled to a second end of the first arm, the camera being supported by the second arm.

35 2. The device of Claim 1, wherein the roller assemblies are coupled to the connecting member at an angle relative to the connecting member.

40 3. The device of Claim 1, wherein each roller assembly includes at least two steam dam rollers configured to engage the steam dam.

4. The device of Claim 3, wherein at least one of the at least two steam dam rollers is driven by the first motor.

5. The device of Claim 3, wherein the roller assemblies each include at least 5 two shroud flange rollers configured to engage a shroud flange of the reactor vessel.

6. The device of Claim 1, wherein the elevating mechanism includes a lead screw rotatably coupled to the mast, and a second motor coupled to the mast and drivingly engaged to the lead screw, and wherein the carriage includes a threaded 10 member mounted thereto, the lead screw being threadably engaged with the threaded member such that the carriage is responsive to rotation of the lead screw.

7. The device of Claim 1, further comprising a third motor coupled to the carriage for rotating the first arm relative to the carriage.

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8. The device of Claim 7, wherein the first arm is coupled to the carriage via an intermediate shaft rotatably supported by at least one pillow block mounted to the carriage, and wherein the intermediate shaft is driven by the third motor to rotate the first arm.

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9. The device of Claim 1, wherein the second arm is rotatably coupled to the first arm in at least one of a first position, in which the camera is positioned below the carriage, and a second position, in which the camera is positioned above the carriage.

10. The device of Claim 9, wherein the second arm is selectively fastened to the first arm in one of the first and second positions.

11. The device of Claim 1, further comprising a float chamber coupled to the
5 second arm opposite the camera, the float chamber being sized to offset weight of the camera.

12. The device of Claim 1, wherein the carriage includes at least two opposing rollers configured to engage opposite sides of the mast.

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13. The device of Claim 1, further comprising a handle coupled to the mast.

14. A visual inspection device configured to traverse a steam dam around a perimeter of a nuclear boiling water reactor vessel, the device comprising:

a trolley including at least two roller assemblies coupled by a connecting member, the roller assemblies being configured to steer the trolley around the perimeter 5 of the reactor vessel, at least one of the roller assemblies being driven by a first motor;

a mast coupled to and upstanding from the trolley;

a lead screw rotatably coupled to the mast;

10 a second motor coupled to the mast and drivingly engaged to the lead screw;

a carriage coupled to the mast and threadably coupled to the lead screw, the carriage being responsive to rotation of the lead screw for movement relative to and along the mast;

a first arm rotatably coupled at a first end to the carriage;

a second arm rotatably coupled to a second end of the first arm;

15 a camera system being supported at one end of the second arm, the camera system being configured for performing visual inspections;

a float chamber coupled to the second arm at an end opposite the camera, the float chamber being sized to offset weight of the camera; and

a tool coupled to the second arm adjacent the camera system.

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15. The device of Claim 14, wherein the roller assemblies are coupled to the connecting member at an angle relative to the connecting member.

16. The device of Claim 14, wherein each roller assembly includes at least two steam dam rollers configured to engage the steam dam.

17. The device of Claim 14, wherein the roller assemblies each include at least 5 two shroud flange rollers configured to engage a shroud flange of the reactor vessel.

18. The device of Claim 14, wherein the second arm is rotatably coupled to the first arm in at least one of a first position, in which the camera is positioned below the carriage, and a second position, in which the camera is positioned above the carriage.

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19. The device of Claim 14, wherein the tool is a water lance.

20. The device of Claim 14, wherein the tool is a vacuum hose.